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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,610	03/29/2004	Clive Clayton	8009-24	2715
22150	7590	01/06/2006	EXAMINER	
F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			BAREFORD, KATHERINE A	
			ART UNIT	PAPER NUMBER
			1762	
DATE MAILED: 01/06/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/811,610	<b>Applicant(s)</b> CLAYTON ET AL.	
	<b>Examiner</b> Katherine A. Bareford	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 16-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

*Claims 10-15 are canceled*

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Dec. 19, 2005 has been entered.

The amendment filed with the RCE submission of Dec. 19, 2005 has been received and entered.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 2 as amended requires that "for forming the monolithic composite material the depth is substantially equal to a thickness of the substrate". However, the

specification as originally filed, in regards to the formation of a "monolithic" composite material only provides that "A process for densification of thermal spray coatings (DTSC) can be employed to admix a thermal sprayed coating into a substrate, producing a monolithic or surface-based composite material having two or more inter-dispersed phases, comprising the sprayed material and a substrate. The depth of the tool 304, including a nib 306, controls whether the composite is monolithic or surface based." (see page 9, lines 8-14 of the specification). Thus, while the composite can be "monolithic" and the depth of the nib controls whether the composite is monolithic, there is no description that the depth of the mixing controlled by the nib is substantially equal to the thickness of the substrate. Therefore, the newly claimed subject matter contains new matter. As well, if this was an inherent requirement of the monolithic forming process, then claim 2 would be not further limiting of claim 1, from which it depends.

*Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the

various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney (US 2003/0042291) in view of Yen et al (US 4157923).

Mahoney teaches a method that provides for densification of a thermal spray coating. See paragraphs [0008] and [0031]. The method includes depositing a thermal spray coating on a substrate surface. Figures 4A and 4B and paragraph [0031] (layer 16). The thermal spray coating and the substrate are later mixed by friction stir welding forming a composite material. Figures 5-6 and paragraphs [0033] – [0036]. Mahoney provides that a second workpiece is also mixed in with the thermal spray coating and the substrate during the friction stir welding. Figures 5-6. The formed composite material area on the article is “monolithic” as a uniform, undifferentiated area of mixing is provided. Paragraphs [0033] – [0034]. The mixing causes metal flow of the thermal spray coating to a depth controlled by a nib of the friction stir coating weld tool into the substrate. Figures 5-6 and paragraphs [0033] – [0036].

Claim 3: the thermal spray coating can be deposited by plasma spray. Paragraph [0031].

Claim 6: the substrate can be a ferrous alloy. Paragraph [0028].

Claim 7: the substrate can be a non-ferrous alloy. Paragraph [0028].

Claim 8: the thermal spray coating can be a metal. Paragraph [0029].

Mahoney teaches all the features of the claims except that the composite material consists of the thermal spray coating and the substrate (without the second workpiece).

However, Yen teaches that it is well known to provide a substrate with a thermal spray coating, such as a plasma sprayed substrate, and to then to mix together the coating and substrate to form a composite material at the surface of the substrate that consists of the thermal spray coating and the substrate. Column 4, lines 45-55, column 5, lines 40-50 and figures 1-5. This is done by using by a high energy beam to melt the coating and substrate together. Column 4, lines 10-40. This provides a hardening of the substrate, for example. Column 2, lines 45-55. The substrate can be an aluminum alloy, for example. Column 5, lines 1-15. The thermal spray coating can be a metal. Column 6, lines 15-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahoney to also form a composite material by friction stir welding only a substrate and thermal spray layer as suggested by Yen with an expectation of providing a hardened substrate, because Mahoney teaches a method of forming a composite material into a substrate by friction stir welding materials that include a thermal spraying layer and a substrate, and Yen teaches that it is desirable to form a composite material on a substrate that consists of a mix of a thermal spray layer and a substrate in order to form a desirably hardened surface.

7. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney in view of Yen as applied to claims 1, 3 and 6-8 above, and further in view of Lazarz et al (US 6227435).

Mahoney in view of Yen teaches all the features of these claims except powder flame spraying (claim 4) and two wire electric arc spraying (claim 5).

However, Lazarz teaches that a conventional method for applying metallic and other coatings is by thermal spraying. Column 1, lines 20-35. Thermal spraying processes all require a heat source, a propelling device and a feed material. Column 1, lines 25-35. Thermal spraying encompasses spraying powder and wire materials, by processes such as plasma spraying, flame spraying (combustion and HVOF) and electric arc spraying (including twin wire electric arc spraying). See column 1, lines 25-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahoney in view of Yen to replace the plasma spraying with flame spraying of powder materials or twin wire electric arc spraying as suggested by Lazarz with an expectation of providing a desirable coating to be treated by friction stir welding because Mahoney in view of Yen teaches a method of coating a metal material that includes the thermal spray method of plasma spraying, and Lazarz teaches that when coating metal metals desirably plasma spraying or similar thermal spraying methods such as flame spraying and twin wire electric arc spraying can be used to apply the material from powder or wire.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney in view of Yen as applied to claims 1, 3 and 6-8 above, and further in view of Sherman (US 2003/0012678).

Mahoney in view of Yen teaches all the features of this claim except determining a time between depositing the thermal spray coating and the friction stir welding according to a distance between a spray gun and a friction stir welding tool and a speed of the substrate relative to the gun and tool.

However, Sherman teaches applying a thermal spray coating to a substrate and then to densify the coating using a friction tool following behind. Figures 1 and 2 and paragraphs [0012] – [0016], [0027] and [0032]. This provides a controlled time between the coating and the welding. Paragraph [0032] and figure 2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahoney in view of Yen to control the time between coating and welding as suggested by Sherman with an expectation of providing a desirably efficient coating treatment because Mahoney in view of Yen teaches a method that includes a thermal spray coating followed by a later friction welding treatment, and Sherman teaches that when thermal spray coating followed by a friction welding treatment, it is desired to perform the treatment as quickly as possible (see paragraph [0032]). One of ordinary skill in the art would perform routine experimentation to optimize the time between treatments based on the specific results desired and coating materials used.



9. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney in view of Yen as applied to claims 1, 3 and 6-8 above, and further in view of Salito (US 6113991).

Mahoney in view of Yen teaches all the features of these claims except the depositing of a second, not densified, thermal spray coating.

However, Salito teaches that in the thermal spraying art, it is well known to provide a first layer on a substrate that mixes with the substrate and then to provide further layers of thermal spray coating over the first layer that are not densified into the substrate. See figure 2 and column 2, lines 15-35 and column 3, lines 1-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahoney in view of Yen to apply further thermal spraying layers as suggested by Salito with an expectation of providing a desirably efficient coating treatment because Mahoney in view of Yen teaches a method that includes a thermal spray coating followed by a later friction welding treatment, and Salito teaches that when thermal spray coating a first layer on a substrate that mixes with the substrate, it is well known to provide further layers of thermal spray coating over the first layers that are not densified into the substrate.

*Response to Arguments*

10. Applicant's arguments filed Dec. 19, 2005 have been fully considered but they are not persuasive.

As to claims 1, 3 and 6-8 applicant argues that Mahoney and Yen do not teach the forming of a "monolithic composite material" as claimed. The Examiner has reviewed these arguments, however, the rejection is maintained. Applicant never defines what exactly is required by a "monolithic" composite material in the arguments or in the specification as originally filed, so the Examiner bases her understanding of the term "monolithic" by the dictionary definition of the term, which teaches a uniform, undifferentiated whole. It is the Examiner's position that Mahoney teaches such a "monolithic composite material" as discussed in the rejection above, because the claims require the composite material formed to be "monolithic" and while Mahoney does not teach that the entire substrate becomes part of the composite material, the formed composite material area of the substrate/overlayer, etc. is uniform and undifferentiated in composition and thus the formed composite material is "monolithic" to the extent required by the claims.

✓3 As to claims 4, 5 and 9, applicant argues that these <sup>are</sup> ~~all~~ allowable for the reasons given as to claims 1, 3 and 6-8 above. As the rejection of claims 1, 3 and 6-8 is maintained for the reasons given in the paragraph above, the rejection of claims 4, 5 and 9 are also maintained.

As to claims 16-19, applicant argues that multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without

the benefit of hindsight afforded by the disclosure. According to applicant, the Examiner has chosen a multitude of references, apparently in hindsight to reject claims 16-18, however at least Saltio teaches away from the combination, as Salito teaches that in the preferred embodiment two layers are applied one immediately after the other. In the Advisory Action, the Examiner indicated that while immediate application of a second layer is a preferred embodiment, that preferred embodiments do not constitute a teaching away from a broader disclosure. Applicant further points out that Salito discloses the benefits of the immediate deposition, and in view of such disclosure it is applicant's position that Salito does teach away from a subsequent, non-immediate deposition, and accordingly one would not be led to combine Salito with Mahoney and Yen. The Examiner has reviewed these arguments, however, the rejection is maintained. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Here the Examiner has used three references to demonstrate the obviousness of the claimed invention, as discussed in the rejection above. As to the argument that Salito teaches away from the claimed invention, the Examiner disagrees. Salito teaches

that a second layer can be applied immediately after the first layer to get the benefit of intrinsic stress reduction and savings in cost and time (column 3, lines 5-15). However, it is not required that the layers be applied immediately thereafter. As discussed in MPEP 2123, preferred embodiments do not constitute a teaching away from a broader disclosure. MPEP 2123 notes that "A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." In re Gurley, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). Thus, while Salito indicates benefits of immediate application of the second layer, it does not teach away from the also indicated possibility of non-immediate application of the second layer.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
KATHERINE BAREFORD  
PRIMARY EXAMINER